

**REMARKS**

Claims 1-16 and 35-50 are pending. Claims 17-34 are canceled.

Claims 1 and 35 are herein amended. Claims 3-9, 11 and 16 were previously amended.

Support for the current amendment to claims 1 and 35 further clarifying “Region II” as “greater than about 25% homologous with the sequence consisting of positions 72 through 93 of SEQ ID NO:1” may be found, for example, in claim 1, as originally filed; Figure 1 and the illustration of Figure 1 at column 4, line 60 through column 5, line 7; Example 1, column 10; and Example 4, column 12. The current amendment replacing SEQ ID NO:2 with SEQ ID NO:1 may be found, for example, in the sequence listing where SEQ ID NO:2 is the nucleic acid sequence that corresponds to the amino acid sequence listed as SEQ ID NO:1.

Please note that that the correct Attorney Docket No. for this application is “77670/593.”

**Response to Concerns Raised by the Examiner  
in the Advisory Action of April 18, 2006**

In the Advisory Action mailed April 18, 2006, the Examiner chose not to enter the amended claims submitted in the Amendment and Response to Final Office Action under 37 C.F.R. § 1.116 filed March 31, 2006 because “the claims as amended raise the issue of new matter and require further consideration.” In particular, the Examiner alleged: (1) the term “Region II” was “unclear . . . in view of the term ‘comprising;’” and (2) while “the specific ‘species’ of prenyl diphosphate synthase ‘region II’ sequences disclosed in the specification may share 25% homology with SEQ ID NO:1, these disclosed ‘species’ do not support the ‘genus’ of any ‘region II’ sequences.” Applicants respectfully traverse the comments in the Advisory Action and request the Examiner consider the following remarks in response to the Examiner’s concerns and in support of the claims as amended.

**A. Clarity of “Region II”**

Applicants have amended claim 1 and 35 to expedite prosecution. As such, the Examiner’s concern with the term “comprising” should be obviated.

## **B. The Written Description Guidelines Support the Written Description of “Region II”**

Applicants respectfully submit the Examiner’s concern with support for the genus of “Region II” may be overcome with a review of the Written Description Guidelines. 66 Fed. Reg. 1099, 1106. The Guidelines instruct that the written description requirement may be satisfied by: (1) “sufficient description of a representative number of species by actual reduction to practice;” (2) “reduction to drawings, [or] disclosure of relevant, identifying characteristics, *i.e.*, structure or other physical and/or chemical properties;” (3) “functional characteristics coupled with a known or disclosed correlation between function and structure;” or (4) “by a combination of such identifying characteristics, sufficient to show the applicant was in possession of the claimed genus.” *Id.* With respect to “Region II” as defined in the claims, Applicants have satisfied each of the four possibilities set forth in the Guidelines for fulfilling the written description requirement.

Concerning the first possibility set forth in the Guidelines, Applicants have provided at least five working examples of the claimed invention wherein the description of “Region II” (having greater than about 25% homology with positions 72 through 93 of SEQ ID NO:1) is disclosed. *See* Col. 6, lines 48-64 and Examples 2-5, columns 10-14 (specific Region II sequences are set forth in Example 2, columns 35-63).

Concerning the second possibility set forth in the Guidelines, Applicants have provided drawings (Figure 1) providing the exact structure of 10 particular species of “Region II” in various prenyl diphosphate synthases (each having greater than about 25% homology with positions 72 through 93 of SEQ ID NO:1). These 10 species are found within plants (*Arabidopsis*, lupin and pepper), sulfurous bacteria (*Sulfolobus*), non-sulfurous bacteria (*Rhodobacter*), bacteria adapted to plant environments (*Erwinia*), myxococcal bacteria, and fungi (*Neruospora crassa*). Applicants have provided a wide array of species representing wildly divergent species, families, orders, kingdoms and even metabolic pathways within living things. “Region II,” as claimed, is clearly conserved across living things and is disclosed with all of the identifying characteristics required by the Written Description Guidelines.

Concerning the third possibility set forth in the Guidelines, Applicants have not only provided 5 working examples and 10 drawings of Region II, each of the 15 species of Region II provided by Applicants have been fully correlated with the prenyl diphosphate synthase function.

As such, Applicants have provided 15 examples of structure correlated with function. When structure is fully correlated with function (and especially, as here, where the structure/function correlation is known in the art) written description should be satisfied.

Finally, concerning the fourth possibility set forth in the Guidelines, the combination of data provided for “Region II” among the first, second and third possibilities set forth in the Guidelines provides the skilled artisan with unmistakable recognition that Applicants possessed the genus of Region II as recited in the claims and the genus of the mutant prenyl diphosphate synthase as claimed.

In view of Applicants satisfaction of the four possibilities for written description support established in the Written Description Guidelines, Applicants respectfully submit the concerns expressed in the Advisory Action are allayed.

**C. Written Description Support by a “Representative Number” of Species is Inversely Related to Skill and Knowledge in the Art**

The Written Description Guidelines additionally provide this guidance: “Satisfactory disclosure of a ‘representative number’ [of species] is an inverse function of the skill and knowledge in the art.” *Id.* Applicants respectfully submit the specification establishes on its face that skill and knowledge in the art were very high. Column 3, lines 30-65. In fact, Applicants expressly suggest that “Region II” of the wild-type prenyl diphosphate synthase is known in the art: “It is proposed that there are five conserved regions in the amino acid sequence of a prenyl diphosphate synthase . . . [and] [i]t is also known that . . . there is an aspartic acid-rich domain conserved sequence I . . . in region II.” Applicants’ specification further directs the skilled artisan to Chen *et al.*, Protein Science Vol. 3, pp. 600-607, 1994, which supports Applicants’ statement concerning knowledge in the art and establishes Applicants’ description of “Region II” as having “greater than about 25% homology with positions 72 through 93 of SEQ ID NO:1.” *See* Chen at 604, Figure 4.

In support of Applicants’ assertion that Region II of wild-type prenyl diphosphate synthase is known in the art, the specification discloses specific examples of wild-type prenyl diphosphate synthases where “Region II” is known: *Bacillus stearothermophilus*, *E. coli*, *Saccharomyces cerevisiae*, *Neurospora crassa*, and human. A review of Chen makes clear that the art possessed wild-type prenyl diphosphate synthases for each of the above-listed species

(and many more) and each species of "Region II" discussed in Chen is described within the claimed genus having "greater than about 25% homology with positions 72 through 93 of SEQ ID NO:1." As such, Applicants have clearly established high knowledge and skill in the art for wild-type Region II.

In view of the art's possession of the full genus of "Region II" in wild-type prenyl diphosphate, and in view of Applicants disclosure of at least 15 examples of "Region II," the Written Description Guidelines instruct that a "representative number" of the sequences have been disclosed because Applicants have established in their specification a high level of skill and knowledge in the art coupled with disclosure of an exceptional number of sequences.

In view of Applicants satisfaction of the inverse correlation of knowledge and disclosure established for genus claim elements in the Written Description Guidelines, Applicants respectfully submit the concerns expressed in the Advisory Action have been alleviated.

### **CONCLUSION**

The claims are believed to be in condition for allowance and Applicants respectfully request the same. The Examiner is invited to contact the undersigned to discuss any issues related to this application.

The Office is authorized to charge any fees, including extension fees, or credit any overpayment regarding this application to Kenyon & Kenyon LLP **Deposit Account No. 11-0600**.

Respectfully submitted,

Date: June 2, 2006

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